



Ohio Field Office Request for Closure Site Technical Support



March 28, 2002



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Closure Site Technology Project

BUILDING TAKE DOWN AND DISPOSAL

Project Description:

Three of the five Ohio Field Office (OH) sites have pressing need of Technical Assistance and innovative Technology Deployments in the area of removing the contents of buildings followed by taking the buildings down and disposing of them. The three sites with the most immediate needs are Ashtabula, Columbus, and Mound. In addition, several requests for Technical Assistance have been submitted by West Valley to aid in their future resolution of this problem. While Fernald has their methods and processes well established, the site still needs further assistance in the silos area that is being submitted as part of the Fernald Silos Project.

Of particular importance at Columbus and Mound (and later at West Valley) is the need to find better methods to prevent the release and spread of radioactive contaminants during the equipment removal and demolition of buildings.

While only one immediate Technology Deployment is being requested at Ashtabula, it is expected that Technical Assistance will quickly produce several suggested changes that can be implemented in 2002.

The immediate Technology Deployment request as follows is:

- **AEMP 02-05 Concrete Decontamination**

The individual requests for Technical Assistance as follows are:

- **MEMP 02-01 Mitigation of Fugitive Emissions During Building D&D**
Combined with
- **CEMP 02-03 Stabilization of Radioactive Surfaces During
Commercial Building Destruction**
- **CEMP 02-04 Removal of Radioactive Hot Cell Structures**
- **WVDP 02-01 Decontamination of Radioactive Debris**
- **WVDP 02-02 Decontamination of Building Surfaces**
- **FEMP 02-12 Concrete Recycling at Fernald**

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Building Takedown and Disposal Project

ASHTABULA ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. AEMP-02-05

TITLE: CONCRETE DECONTAMINATION

PROBLEM STATEMENT: AEMP has recently taken down a building that has resulted in the exposure of a concrete pad with a surface area of approximately 5,000 square feet. Part of the surface was known to be contaminated and had been painted with a sealant while the building was still in use. With the building now removed, the pad is now exposed to the elements and the sealant has started to flake and spread contamination.

The immediate problem is to remove the contaminated paint and concrete in order to use the pad for clean container storage.

REQUEST: DOE-OH and AEMP are requesting deployment assistance to provide innovative characterization technology to define the extent of the problem and then the deployment of the most appropriate technology to remove the contamination from the entire pad. The pad needs to be cleaned and available by May 1, 2001.

OHIO TECHNICAL ASSISTANCE REQUEST

Building Takedown and Disposal Project

MIAMISBURG ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. MEMP-02-01

TITLE: MITIGATION OF FUGITIVE EMISSIONS DURING BUILDING D&D

PROBLEM STATEMENT: Mound's current work approach incorporates the strategy of reducing the amount of decommissioning and decontamination that will be conducted on contaminated buildings (R, SW & T). This new strategy focuses on leaving selected contaminated equipment and building components in place to be removed and disposed of during the building demolition stage. This strategy is expected to yield millions of dollars in savings in decommissioning and decontamination costs. The project baseline notes the dismantlement of the building "as is" and the disposal of the building as LLW. Since it is highly desirable to use commercial building demolition techniques, a method to stabilize, fixate, and contain the contamination is desirable during this stage. Mound is located in the middle of a residential area and is currently being developed as an industrial park simultaneous with the cleanup activities. Thus it is critical to MEMP that a process to stabilize etc, the contamination be implemented in order to assure the safety of the public and the private industrial operations being located on site and conform ALARA principles. Technical Assistance is requested to provide the most effective method for this containment. A combination of approaches performed at different times in the remediation process is anticipated. In addition technical expertise related to methods of mitigating fugitive emissions as well as techniques for performing representative environmental sampling would also be needed.

REQUEST: DOE-OH and MEMP are requesting technical assistance to evaluate and define the most effective method to stabilize, fixate, and contain the contamination on the building's surfaces and possibly on in-place equipment in order to facilitate the use of commercial building destruction techniques. A combination of approaches/techniques that will be performed at different times in the remediation process is anticipated. The technical assistance should be initiated within the next two months.

OHIO TECHNICAL ASSISTANCE REQUEST

Building Takedown and Disposal Project

COLUMBUS ENVIRONMENTAL MANAGEMENT PROJECT REQUEST No. CEMP-02-03

TITLE: STABILIZATION OF RADIOACTIVE SURFACES FOR COMMERCIAL BUILDING DESTRUCTION

PROBLEM STATEMENT: The current BCLDP baseline for the West Jefferson North site denotes that the contaminated JN-1 (Jefferson North – JN) Hot Cell Facility will not be decontaminated prior to demolition and thus save millions of dollars in decontamination costs. The project baseline notes the dismantlement of the building “as is” and the disposal of the building as LLW. Since it is highly desirable to use commercial building destruction techniques, a method to stabilize, fixate, and contain the contamination on the building’s surfaces must be established while the building is being brought down and packaged. Technical Assistance is requested to provide the most effective method for this containment. A combination of approaches performed at different times in the remediation process is anticipated.

REQUEST: DOE-OH and CEMP (BCLDP) are requesting technical assistance to evaluate and define the most effective method to stabilize, fixate, and contain the contamination on the building’s surfaces to facilitate the use of commercial building destruction techniques. A combination of approaches/techniques that will be performed at different times in the remediation process is anticipated.

OHIO TECHNICAL ASSISTANCE REQUEST

Building Takedown and Disposal Project

COLUMBUS ENVIRONMENTAL MANAGEMENT PROJECT REQUEST No. CEMP-02-04

TITLE: REMOVAL OF RADIOACTIVE HOT CELL STRUCTURES

PROBLEM STATEMENT: The current BCLDP baseline identifies the use of a water recycled diamond wire cutting process to remove the massive hot cell walls in the JN-1 (Jefferson North – JN) Hot Cell Facility. This methodology minimizes the generation of TRU level waste, minimizes the volume of LLW to be shipped, minimizes the amount of contaminated surfaces that are being disturbed and mobilized, and minimizes the radioactive exposure and containment required for the cell's removal. Holistically, Battelle believes this is the fastest, lowest cost approach given present ALARA, burial, and remediation costs

REQUEST: DOE-OH and CEMP (BCLDP) are requesting technical assistance to conduct an evaluation of the current process and to investigate other methods of hot cell wall removal from a holistic perspective. We are requesting that experts from the National Laboratories and industry be tasked to support us in this evaluation process.

OHIO TECHNICAL ASSISTANCE REQUEST

Building Takedown and Disposal Project

WEST VALLEY DEMONSTRATION PROJECT REQUEST No. WVDP-02-01

TITLE: DECONTAMINATION OF RADIOACTIVE DEBRIS

Problem Statement: Debris requires decontamination to reduce their radioactivity level to place it into a more readily disposable form. The debris is composed primarily of metal, but also includes glass, plastic, wood, filters, and concrete. The debris is contaminated with spent fuel, activation product, and fission product radionuclides, and may also be contaminated with hazardous organic or inorganic compounds. The decontamination technology(ies) should minimize the amount of secondary waste generated and also minimize the production of secondary waste with limited disposal options. The technology should be deployable in both contact handled and remote handled environments. The technology must be designed to minimize radiation exposure during maintenance and also to facilitate decontamination. Remote change-out of equipment consumables would also be preferable.

Request: DOE-OH and WVDP are requesting continued technical assistance for identification, evaluation, and demonstration/deployment of technologies for decontamination, characterization, size reduction, remote handling, and retrieval of debris from radioactively-contaminated facilities in a Large Scale Demonstration and Deployment Project in the years 2002-2004. We are requesting that experts from the National Laboratories and industry be tasked to support us in defining the most cost effective manner in which to manage the highly radioactive debris to support the site's continued progress towards closure.

OHIO TECHNICAL ASSISTANCE REQUEST

Building Takedown and Disposal Project

WEST VALLEY DEMONSTRATION PROJECT

REQUEST No. WVDP-02-02

TITLE: DECONTAMINATION OF BUILDING SURFACES

Problem Statement: Building surfaces require decontamination to reduce their radioactivity level to satisfy facility clean-up criteria. The surfaces are composed of metal or concrete. The surfaces are contaminated with spent fuel, activation product, and fission product radionuclides, and may also be contaminated with hazardous organic or inorganic compounds. The decontamination technology(ies) should minimize the amount of secondary waste generated and also minimize the production of secondary waste with limited disposal options. The technology should be deployable in both contact handled and remote handled environments. The technology must be designed to minimize radiation exposure during maintenance and also to facilitate decontamination. Remote change-out of equipment consumables would also be preferable for deployment in highly radioactive areas.

Request: DOE-OH and WVDP are requesting continued technical assistance for identification, evaluation, and demonstration/deployment of technologies for decontamination, characterization, size reduction, remote handling, and retrieval of debris from radioactively-contaminated facilities in a Large Scale Demonstration and Deployment Project in the years 2002-2004. We are requesting that experts from the National Laboratories and industry be tasked to support us in defining the most cost effective manner in which to manage the highly radioactive debris to support the site's continued progress towards closure.

OHIO TECHNICAL ASSISTANCE REQUEST

Building Takedown and Disposal Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. FEMP-02-12

TITLE: CONCRETE RECYCLING AT FERNALD

Introduction

The Fernald site has ~239,000 cubic yards of concrete/asphalt material in above ground, on ground and below ground buildings, slabs, foundations, footers, etc. The concrete/asphalt represents a surface area of ~27 football fields and requires ~20,000 dump truck loads to transport to the disposal facility.

The current baseline plan calls for the concrete/asphalt material to be removed as a waste material, transported and disposed in the Onsite Disposal Facility, OSDF. To be disposed in the OSDF, it must meet the physical waste acceptance criteria, WAC. The WAC requires that the dimensions of the concrete/asphalt material do not exceed 10' by 4' by 18" and that soil and/or "soil-like" (>90% less than 1" in diameter) material be placed in and around the concrete/asphalt material and compacted. Placement and compaction of soil and soil-like material around concrete/asphalt material minimizes void spaces within the OSDF and mitigates the impact of subsidence on the integrity of the closure cap.

The process of cleaning up a site such as Fernald involves taking buildings down, removing concrete, excavating and moving large volumes of soil, constructing large waste disposal cells, constructing new waste and material processing and handling facilities, moving and installing temporary storage and office facilities, etc. In support of these activities, aggregate is needed for erosion control, building and maintaining access and haul roads, material lay down areas, equipment parking area etc. At this time "clean" aggregate from off site is being purchased and brought onsite for use. Over a one year period (July 00 to July 01), 23,000 cubic yards of "clean" aggregate was purchased and brought onsite in support of the OSDF alone. All of the aggregate that is brought onsite will eventually be disposed of as waste in the OSDF.

Instead of immediately dispositioning the concrete to be removed as waste, Fernald proposes to process (crush) the concrete to the desired size for reuse/recycle. The crushed concrete will replace the clean aggregate, that is being brought onsite for erosion control, building and maintaining access and haul roads, material lay down areas, equipment parking areas etc.

In addition to making aggregate, a concrete crushing process could also make the "soil-like" material (>90% less than 1" in diameter), that is required for placement and compaction around the more typical D&D waste material being disposed of in the OSDF. The use of recycled concrete as a placement and compaction material is expected to reduce closure costs by reducing soil excavation and transportation. Operation of the

OSDF is impacted during the winter due to the problems with excavating, transporting and handling soil (wet, frozen). Use of recycled soil-like concrete will shorten the closure schedule by allowing for continued operation of the OSDF in the winter season, if the placement of the soil-like concrete can meet the compaction standards.

The idea of concrete crushing and recycle has been presented to the Ohio and Federal EPA(s). Both support and encourage the concrete recycling effort.

Need

It is estimated that from now to closure Fernald will use in excess of 80,000 cubic yards of aggregate for erosion control, building and maintaining access and haul roads, material lay down areas, equipment parking area etc. Fernald proposes to supply the aggregate by processing/crushing and recycling concrete from the existing buildings, slabs, foundations, footers, etc. Fernald proposes to use an expert technical assistance team to determine the most efficient and cost effective means for producing aggregate from the existing concrete and then deploy that means.

Benefits

This initiative to recycle concrete, deploy rather than simply dispose of material will reduce site closure costs and shorten the schedule.

The cost savings is estimated to be \$3,200,000, obtained by:

- Reusing the crushed concrete in place of purchasing new clean aggregate
- Reducing the OSDF waste disposal volume by not having to dispose of new clean aggregate
- Reducing the cost to place waste material in the OSDF (crushed concrete cost less to place in the OSDF than bulk concrete)

Other benefits include:

Extended operation of the OSDF in the winter months

- If waste volumes can be reduced enough to eliminate the construction of an OSDF cell, over \$10 million would be saved

Aligns site closure with the Ohio and Federal EPA(s) recommendations for concrete recycling.

Scope

The technical and closure support for concrete recycling consists of two parts.

Part 1: Technical Evaluation and Recommendation Report

Examine available methods/processes/equipment for removing in place concrete and processing it to produce the required aggregate. The examination should address for each method cost, schedule, production capacity, operability, maintenance, safety, equipment decontamination, relocation and reuse at other DOE sites and a make versus buy analysis. Submit a final report and present a

recommendation on the most cost-effective method to Fernald for review and determination.

Part 2: Deploy selected concrete removal and processing technology at Fernald
Initiate and execute a project that will remove and process concrete to meet aggregate and/or soil like material needs at Fernald. Project to include management, procurement, mobilization, operation, demobilization and disposition of equipment.



Closure Site Technology Project

DISPOSITION OF UNIQUE AND PROBLEM WASTES

This document outlines the Ohio Field Office (OH) request for support of technical projects pertaining to the disposition of several types of waste that pose unique problems or have particular barriers to disposal. The issue of problem wastes occurs at each of the Ohio sites. Concise descriptions of the following technical support initiatives are enclosed:

- **FEMP 02-08** **Accelerated Disposition of Discrete Problem Waste**
- **FEMP 02-09** **Accelerated Disposition of Non-actinide Isotopes and Sealed Sources**
- **FEMP 02-10** **Accelerated Fernald Sample Disposition**
- **FEMP 02-11** **Accelerated Disposition of Fernald TRU Waste in T-Hoppers**
- **FEMP 02-02** **Optimal Disposition of Fernald Unique Wastes**
- **AEMP 02-01** **Container Macroencapsulation**
- **MEMP 02-05** **Management of Electronic Equipment from Radioactive Materials Management Areas**
- **MEMP 02-06** **Mobile/Modular Waste System**
- **WVDP 02-03** **Sludge Stabilization**
- **WVDP 02-04** **Development of Grout for In-Situ Closure**
- **FEMP 02-13** **Treatment and Beneficial Use of Organically Contaminated Soil**
- **FEMP 02-14** **Disposition of Enriched Uranium Compounds and Residues**

Some of the technical support project initiatives that follow are intended to start with a Technical Assistance effort to identify the optimum new technology or approach, and then transition into support for deployment of the approach. The request from OH to OST is to support both the TA and the Deployment Project.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. FEMP-02-08

TITLE: ACCELERATED DISPOSITION OF DISCRETE PROBLEM WASTE

Need

Fernald is a closure site with a closure date of December 2006. To meet this schedule, Fernald waste must be treated for shipment and disposal. Discrete waste types and matrices are a particular challenge and increase costs. The challenge is to reduce cost and schedule associated with such wastes as Inorganic Mercury, Inorganic MACRO/Decontamination and miscellaneous or unique Sample Disposition Projects. There is an opportunity to save costs through innovative contracting or improved technical approach to accelerate project schedules. This initiative contributes to overall closure acceleration of the Fernald site, as well as for similar problems at other Ohio sites. Fernald requests expert procurement and technical assistance in identifying and applying innovative methods to save schedule and cost for these tasks at Fernald.

Scope and Deployment

Fernald currently plans to treat three discrete waste streams in FY02-04. The inorganic mercury and inorganic macro/decontamination are currently planned to be treated off site under contracts to be awarded in FY02. Instead, and to accelerate schedule, it is possible that a "milk run" could be made through the Ohio sites under a single contract that would save costs to each site through combined buying power. Fernald is requesting expert technical assistance in identifying and developing innovative and technical deployment support for effective and optimum methods to safely, economically, and efficiently treat, ship, and dispose of the discrete problem waste streams. Examples follow.

The Fernald sample disposition project is currently scheduled for completion in FY04. Fernald is requesting expert technical assistance and support of this project in FY02-03 to identify a process that would result in a year of schedule acceleration and associated cost savings.

The following table presents the quantities and associated costs for some of the discrete waste streams at Fernald. The Fernald goal is to accelerate schedule and reduce cost for these projects and is requesting expert technical assistance and deployment support from OST to achieve this goal.

Discrete Waste Streams / Quantities and Costs		
Category	No. of Containers	Estimated Cost
Inorganic Mercury	22	\$166,451
Inorganic Macro/Decontamination (Lead Shapes)	61	\$552,736
Sample Disposition	453	\$1,377,761
Total		\$2,096,948.00

Schedule

Inorganic Mercury - project completion FY02

Inorganic Macro/Decontamination - project completion FY02

Sample Disposition - project completion FY03 (one year schedule acceleration)

Benefit Analysis

A one-year project acceleration is the goal; intended to off set project risk and unrecognized additional cost for successful site closure in 2006.

Summary

Fernald requests \$2.1M for technical support to deploy accelerated disposition approaches for discrete waste disposition to aid Fernald and other Ohio sites.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. FEMP-02-09

TITLE: ACCELERATED DISPOSITION OF NON-ACTINIDE ISOTOPES AND SEALED SOURCES

Need

Fernald requires support of an expert technical assistance team and support for rapid technology deployment to identify the best characterization/handling/treatment/disposition path for sealed sources. Fernald has identified approximately 970 sealed sources that require planning, evaluation, and characterization in preparation for appropriate, timely disposal to support the accelerated site closure schedule. More sources may be found as the buildings are prepared for demolition. These sealed sources are in the categories of: neutron (2), orphan (2), thorium and U238 actinides (324), Am-241 actinide (80), exempt Ra-226 (54), other accountable (103), and other exempt (405) for a grand total of 970. Approximately 80 percent of these are available now for disposition, and the remainder will become available as site cleanup progresses.

Scope

Fernald requires support for an expert technical assistance team and rapid technology deployment to identify the best characterization/handling/treatment/disposition path for sealed sources. The technical assistance team would evaluate the baseline approach and make appropriate recommendations to be implemented by the project team.

The baseline scope of this task is as follows:

1. Offer the sealed sources on the excess board through Property (this has been done for 624 of them and the remaining 346 are in the process of being offered). Based on the first offering (there were only three expressions of interest for a total of less than 20 sources), it is unlikely any interest will be generated.
2. Work with the three responses to determine validity of interest and follow-up accordingly.
3. Work with DOE's Off-site Source Recovery Project (OSRP) personnel in Los Alamos to dispose of the Am-241 sources (81 of them). This is significant in that there are currently no disposal facilities that can accept Am-241. The OSRP is willing, once we get the sources registered with them, to come to Fernald and package these sources (two of their personnel are required to personally package the material prior to shipment to Los Alamos, where the sources will be stored pending ultimate disposal at the WIPP). Approximately 65 of the Am-241 sources are still in use at Fernald's on-site Lab.

4. Work with a local supplier of sealed sources to gain expertise in removal of the sources from instruments and gauges. For example, there are 38 Cs-137 level gauges, which are about one cubic foot in volume. Removing the source would allow the instrument to be disposed of as low level waste and greatly reduce the volume for the sealed source disposal (less than a cubic inch per source).
5. Determine if any of the exempt sources meet the criteria for disposal through the Soil Pile 7 to Envirocare or the On-site Disposal Facility.
6. Obtain characterization/profile for disposal of sources that meet the waste acceptance criteria for the Nevada Test Site.
7. Work with the Non-actinide Isotopes and Sealed Sources Management Group (NISSMG) to disposition the neutron sources, as they become available, as well as drawing upon their expertise for other disposal options.

Schedule

There are currently 397 excess sources in the Laboratory Building, of which approximately one-fourth are accountable sources. These must be relocated before September 2002 in order to support the demolition schedule for that building. Therefore, the current focus is to disposition as many of these as possible prior to the move.

The remainder of the sources is baselined for disposition by September 2003.

- | | |
|---|----------------------|
| * Convene Expert Technical Assistance Team | - May 1, 2002 |
| * Conclude Expert Technical Assistance Team | - September 30, 2002 |
| * Deploy Technology/Technical Solution | - June 2, 2002 |
| * Complete Deployment | - September 30, 2003 |

Analysis

The cost benefit depends on the specific portion of sources to be addressed. If funding was available this fiscal year to enable the site to be trained in removal of sources from instruments and gauges, resulting in volume reduction, there would be a significant savings. For the level gauges alone, this could result in a reduction from 38 drums to one drum.

If funding was available either this fiscal year to permit the OSRP to package and ship the excess Am-241 sources, that would be a significant savings over the site's own effort to characterize/profile these transuranic sources. The NISSMG estimate for establishing a TRU waste certification program is ~\$1 million. Costs for the OSRP option have not been defined yet, but indications are that it would just be the costs of the shipping containers.

Additional benefits:

- Reduced landlord costs of continuing to store/inventory the excess sources.
- Minimize the need for storage space required in the relocation effort prior to September 2002.

Summary

Fernald requests support of an expert technical assistance team to evaluate the disposition options listed above to minimize the relocation effort in the fall of 2002, and to support a disposition project for the completion of site closure within the accelerated schedule by deploying/implementing the recommendations of the expert technical assistance team.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. FEMP-02-10

TITLE: ACCELERATION OF FERNALD SAMPLE DISPOSITION

Need

Fernald requires support of an expert technical assistance team and support for rapid technology deployment to identify and deploy the best characterization/handling/treatment/disposition path for unused sample material. Fernald has accumulated a significant quantity of unused contaminated samples over the past 12-15 years. The unused samples are comprised of the portion of a sample left over after analysis has been completed and/or they are archived samples, which are no longer needed. The sample material is contained in a large number of small sample jars and containers. Because the samples contain radioactive materials owned by the Department of Energy, the laboratories that performed the analysis were required to return them to Fernald when the analysis was completed.

The process of sample disposition had had limited success in the past due to the labor-intensive nature of the work process. Researching sample origin, performing characterization and disposition of tens of thousands of individual samples was and is a daunting task. Samples were/are accumulated in containers and placed in storage until a more efficient process emerges. Currently, there are approximately 453 containers of unused samples in storage.

Scope

Fernald requires support for an expert technical assistance team and rapid technology deployment to identify the best characterization/handling/treatment/disposition path for unused sample material. The current baseline disposition plan is based on performing field classification / characterization using real time instruments and finger print analysis. The information obtained in the field will be used to determine physical and chemical characteristics of the material so that it can be segregated and consolidated into logical groupings that can be integrated into existing Fernald waste streams.

Once the segregation/consolidation is complete the resulting waste streams will be managed in accordance with applicable federal, state and local rules and regulations.

The task of the expert technical assistance team would be to evaluate the baseline and determine if alternative methods could be employed to save costs and reduce schedule. This project is critical to remove the waste inventory from a building scheduled for D&D.

Schedule

The sample disposition project is currently scheduled for completion in FY04. Funding this project in FY02-03 would permit a year of schedule acceleration and associated cost savings.

* Convene Expert Technical Assistance Team	- June 3, 2002
* Conclude Expert Technical Assistance Team	- September 30, 2002
* Deploy Technology/Technical Solution	- December 2, 2002
* Complete Deployment	- July 31, 2003
* Ship for Final Disposition	- September 30, 2003

Cost Benefit Analysis

The current baseline cost estimate for the Sample Disposition Project is \$1,377,761 for the 453 containers in inventory. The project is scheduled in the baseline for funding and completion in FY04.

The benefit of providing support to Fernald will be to enable the completion of closure activities by the end of 2006. There are opportunities to save costs through innovative contracting, technology application, and schedule acceleration and the associated out-year dollar-cost escalation. The project schedule will also be accelerated by at least one year. This contributes to overall closure acceleration of the Fernald site.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. FEMP-02-11

TITLE: ACCELERATED DISPOSITION OF FERNALD TRU WASTE IN T-HOPPERS

Problem

In the late 1990's Fernald discovered it had two T-Hopper containers (out of several hundred scheduled for shipment to the Nevada Test Site) that contained a heel of residual material. The T-Hoppers had been designated as "Empty" several years earlier, which was the practice at that time once all easily removable material had been processed. Samples of the heel material were collected from the T-Hoppers and revealed that the heel material in both T-Hoppers is hazardous for chromium (D007), which has a regulatory threshold of 5 PPM. The chromium analysis indicated 52.5 PPM and 9.7 PPM respectively. In addition the analysis revealed that the heel in one of the T-Hoppers exceeded 100 nCi/gm transuranic activity and is potentially classified as transuranic (TRU) waste. Sample results indicated the transuranic activity was between 114 nCi/gm and 500 nCi/gm. The calculation used to determine the specific activity and the maximum concentration of contaminants for toxicity characteristic of the T-Hopper did not include the mass of the T-Hopper itself. The fact that the T-Hopper masses was excluded from the calculation is significant in that the activity/gm and concentration/gm is considerably less when you include the masses of the T-Hoppers. The heel material contained in each T-Hopper is estimated to be approximately 400 pounds. The combined mass of the heel material is estimated to be approximately 800 pounds. Fernald currently has no program for TRU waste, and establishing such a program would be excessively costly and long. The T-Hoppers are severely deteriorated and cannot be used for their intended purpose as a shipping/process vessel for UF₄.

Solution

Assistance is needed to identify and enable the site to act on the best characterization, handling, treatment, and disposition path for this troublesome waste. The T-Hopper waste is a unique waste at Fernald and is an impediment to accelerated site closure. The OST (TRU/Mixed Waste Focus Area) is requested to lend technical assistance as well as support for regulatory initiatives, treatment and disposal of the T-Hoppers. The Non-actinide Isotopes and Sealed Sources Management Group is exploring the potential to have the T-Hopper that is potentially TRU-contaminated included in the disposition path for the two neutron sealed sources (potentially to be dispositioned through Savannah River). If final characterization determines the residue is in fact TRU waste, then Fernald will require assistance due to the lack of a site program for TRU waste certification and acceptance. Final characterization will determine specific treatment/disposition path(s) available to the Project and will determine total project cost.

Schedule

The end of FY03 to meet the accelerated closure schedule. Fernald will request \$0.5M for the rapid deployment of assistance and technology for project completion in FY03.

Cost

Total worst-case project cost is estimated to be \$0.5M.

Benefit Analysis

Since Fernald has no TRU waste certification program, this initiative will enable disposition, directly address project risk, and enable Fernald to complete site closure by the end of 2006. This initiative will directly benefit other Ohio sites with similar problem waste disposition issues.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. FEMP-02-02

TITLE: OPTIMAL DISPOSITION OF FERNALD UNIQUE WASTES

What the Project Needs

Fernald Waste Generator Services is responsible for disposition of the contaminated legacy waste from the closure site. The current vigorous waste management activities are focused on the disposal of large volume, well characterized waste streams. However, many “Unique” wastes have been identified among the large array of legacy wastes requiring disposal. Many of the unique wastes are small quantities of discrete contaminated material that, individually, are particularly troublesome for disposal. Examples of the unique wastes at Fernald include a T-hopper containing transuranic material, cold traps with legacy UF₆, off-specification materials such as niobium used in research, and pyrophoric metals. As site closure operations proceed, the easier and larger quantity waste streams have been treated first. The waste streams remaining are the smaller, more difficult ones where considerable cost and expertise will be needed to eliminate the unique problem wastes and allow D&D to proceed on the structures currently storing the wastes.

A technical assistance and technology deployment support is needed to form a team of waste treatment/disposal experts to examine how to use all available solutions (commercial, DOE sites, etc.) to provide an optimized, rapid disposition path or pathways forward in the remaining time. The chief driver is schedule. All mixed waste inventories must be removed from the site by the end of FY03 to allow Fernald to meet its aggressive 2006 closure schedule. The technical assistance team would work closely with site personnel to examine options, recommend the path(s) forward, participate in the treatment vendor selection, and assist in the complete and final disposition of the Fernald unique wastes. The potential treatment technologies need to be researched in order to allow the project to select the best technology applicable to the task (retrieval, (re) characterization, treatment, donation, etc.) for each unique waste. Options the technical assistance team could examine may include waiver of existing regulatory requirements or exemptions for the small quantities represented by the Fernald wastes, or composting the wastes. Once the optimum disposition path is determined, each unique waste and the applicable technology will be projectized for deployment support. Projectized activities for each unique waste would include development of work plans, deployment of applicable technology, implementation of support activities, and waste disposal.

Scope, Deployment

Fernald currently does not have the expert resources to work on multiple fronts to study the various options and optimize the disposition approach for the huge number of small quantity waste streams that exist, as well as those that are expected to develop from occult locations as the site closes. Currently, the rough order of magnitude estimate is 100 such waste streams. The scope of this project would be as follows

- Assemble a multi-disciplinary expert team
- Identify unique wastes and disposition needs
- Evaluate applicable technologies, paths and options for disposition
- Define scopes of work for the unique wastes
- Prepare Work Plans
- Conduct full-scale operations to eliminate the Fernald waste on closure schedule

Schedule

All technical assistance, testing and preparations for deployment would begin in FY02, and expedited deployment would need to conclude in FY03. The project should be conducted in two phases.

Phase I -- Immediate OST support in FY02 to form a Technical Assistance Team to identify unique, low volume wastes at the FEMP, and identify and plan the deployment of applicable technologies and path(s) forward for the management and disposition of the wastes to meet the 2006 site closure schedule. This task is estimated to require the help of three to five dedicated experts from within the DOE system, national labs or industry to form the team for the duration of the effort.

Phase II -- Fernald will request support for technical assistance and deployment assistance for any novel, uncertain or risk-prone technologies recommended by the Technical Assistance Team to facilitate the rapid disposition of the problem waste streams in FY03. The cost for this work is uncertain, but is expected to total several million dollars. The cost will depend on the benefits achievable by the Technical Assistance Team.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

ASHTABULA ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. AEMP-02-01

TITLE: CONTAINER MACROENCAPSULATION

PROBLEM STATEMENT: AEMP has a two intermodals (1,350 cf) of mixed waste debris as large HEPA filters and prefilters that require macroencapsulation. They are outside Envirocare's treatment waste criteria. The optimum treatment method is direct containerization into appropriately-sized containers. The currently-approved onsite macro system is designed for smaller debris and the HEPA filters require significant handling and sizing at an increased cost and risk of exposure.

REQUEST: DOE-OH and AEMP are requesting deployment assistance to provide subject matter experts from the former Mixed Waste Focus Area, as applicable, to help finalize the path forward (ref. Dave Eaton, DOE Macro Working Group). This will help expedite approval of an alternate polyethylene container package that can be easily sealed onsite and shipped to Envirocare (i.e. "cubic" parallel to the cylindrical Arrowpack).

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

MIAMISBURG ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. MEMP-02-05

TITLE: MANAGEMENT OF ELECTRONIC EQUIPMENT FROM RADIOACTIVE MATERIALS MANAGEMENT AREAS

PROBLEM STATEMENT: A significant amount of electronic equipment is being removed from Radioactive Materials Management Areas (RMMAs) during the Mound Exit Project. Due to the presence of lead and other RCRA heavy metals on printed circuit boards contained in most of this equipment, these circuit boards are removed from the equipment and radiologically surveyed prior to packaging the equipment in a waste container. The circuit boards are released for unrestricted use and managed through BWXTO waste operations as non-radioactive material for recycle where possible, or as non-radioactive hazardous waste, if necessary. The electronic equipment, once the circuit boards are removed, is being managed as Low-Level Radioactive Waste (LLW) and packaged for disposal at the Nevada Test Site (NTS).

Disassembling electronic equipment in place, removing circuit boards, surveying the circuit boards, and managing the circuit boards separately from the remainder of the equipment, is a time and resource intensive process. It is estimated that a minimum of \$15,000/month is being expended in these efforts. In addition, the management of the electronic equipment as LLW is often dictated by the difficulties in adequately characterizing the equipment to allow its unrestricted release.

REQUEST: DOE-OH and MEMP (BWXTO) are requesting technical assistance in identifying, developing, and evaluating alternatives to the current methods which may include:

1. Radiological characterization methodologies which allow the unrestricted release of equipment without extensive disassembly of the equipment, alleviating the need to manage the equipment as LLW.
2. Decontamination methodologies which allow the unrestricted release of equipment without extensive disassembly of the equipment, alleviating the need to manage the equipment as LLW.
3. Segregation techniques for the removal of components containing RCRA materials from electronic equipment in a significantly more efficient manner than the currently employed methods.

Any additional suggestions to deal with this problem that are not outlined above should also be identified and considered for evaluation.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

MIAMISBURG ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. MEMP-02-06

TITLE: MOBILE/MODULAR WASTE SYSTEM

PROBLEM STATEMENT: Mound's current baseline requires the transitioning of the sanitary sewer plant to the Miamisburg Mound Community Improvement Corporation (MMCIC), the economic redevelopment agency for the Mound. The plant, as it has been operated in the past, has processed minimal levels of radioactivity contaminated sanitary sewage and trace levels have been detected in the effluent and in the sludge. The sludge has been disposed at EnvironCare as ad contaminated waste. If the current plant is bypassed in favor of a direct connection with the city's sewer plant the State's requirement of no rad-added to the environment appears to be a barrier. The concerns with the plant are two-fold. The first is the feasibility of transitioning the facility to the MMCIC based on its past operational history and the residual contamination expected in the system. Secondly, several potential release sites are located in the area which may require further evaluation and possible remediation. If the need for the plant to be decommissioned and/or decontaminated becomes apparent then alternate viable strategies/technologies for the treatment of the influent becomes a necessity.

REQUEST: DOE-OH and MEMP are requesting technical assistance to evaluate and define the most effective baseline strategy which could include the use of a mobile modular waste water treatment system to allow the existing system to be taken off line for evaluation and/or remediation. Once the strategy is developed then assistance, through the deployment of technology or further technical assistance would be anticipated to aid in its implementation.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

WEST VALLEY DEMONSTRATION PROJECT REQUEST NO. WVDP 02-03

TITLE: SLUDGE STABILIZATION

Problem Statement: Treatment of radioactively contaminated wastewater at the West Valley Demonstration Project has produced low-level waste sludge that requires stabilization for disposal. The sludge is contaminated primarily with Cs-137 and Sr-90 and is stored in 55 gallon drums in both raw sludge form, and in a partially cement-stabilized form. Both forms require stabilization to meet disposal site criteria, especially for free liquid content.

Request: DOE-OH and WVDP are requesting continued technical assistance for identification, evaluation, and demonstration/deployment of technologies for treatment and/or solidification of contaminated sludge. We are requesting that experts from the National Laboratories and industry be tasked to support us in defining the most cost effective manner in which to manage the radioactive sludge to support the site's continued progress towards closure.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

WEST VALLEY DEMONSTRATION PROJECT REQUEST NO. WVDP 02-04

TITLE: DEVELOPMENT OF GROUT FOR IN-SITU CLOSURE

Problem Statement: A grout recipe is needed that includes reducing agents and sorbents for capturing and/or binding mobile radiological and chemical contaminants. The grout would also serve to stabilize residual salts in-place in the tanks. The grout would be used for in-situ high-level waste tank closure and for building stabilization to preclude the release of contaminants to the environment when wastes are closed in place. The grout would also have the characteristics of being pourable/pumpable, possess structural strength, and able to be readily excavated in the event that an alternative method of closure is developed.

Request: DOE-OH and WVDP are requesting technical assistance and funding support for the development and testing (bench-scale to field) of a pumpable grout material possessing structural strength and the ability to bind or capture long-lived radionuclides. This material will be an important component of the in-place stabilization alternative presented in the Decommissioning and/or Long-Term Stewardship EIS. This will help expedite preparation of the WVDP Decommissioning and/or Long-Term Stewardship EIS and supporting documentation.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. FEMP-02-13

TITLE: TREATMENT AND BENEFICIAL USE OF ORGANICALLY CONTAMINATED SOIL

Introduction

At Fernald there are organically-contaminated soils that are not permitted to be put into the On-Site Disposal Facility (OSDF) in their present condition. Options are to treat the material, or to dispose of it off site. The known sources of these soils at the site are numerous. Excavation and stockpiling of some of the soils was initiated in early FY02. Additional quantities of organically-contaminated soil have yet to be excavated. Others may be discovered. Fernald could benefit strongly from identifying and deploying optimum technologies for treatment of the organically-contaminated soils, rather than experiencing the labor and cost of disposing of it. The Fernald and stakeholder preference is to avoid off site disposition and exercise beneficial use of the soil. Fernald therefore requests expert technical assistance to assess technical and cost factors, evaluate potential innovative approaches, recommend the optimum technologies, and implement the approach that will assure safe, cost effective, and timely closure of the Fernald site. Fluor Fernald also requests OST support for assured deployment of the optimum technologies to address site needs and support site closure by 2006.

Need

Organically-contaminated soils from across the Fernald site require treatment to enable disposal in the OSDF. The known sources of these soils at Fernald are:

- The area behind the former Maintenance Building within Area 3A
- The former Incinerator Pad within Area 3A
- Beneath the floor of former Plant 6 within Area 4A
- And the sump located west of the former Pilot Plant within Area 4B.

Suspected sources of organically-contaminated soil are:

- The vicinity around and under Plant 2/3
- The vicinity around and under Plant 8.

Approximately 5,400 cubic yards of soil require treatment for organic contamination.

Fluor Fernald has conducted a limited study to identify an optimum technology to treat the soil. Fernald needs technical and deployment support to identify the optimum

approach and to deploy it in a timely and efficient manner. One candidate (but uncertain) technology would be to use zero-valent iron to treat the excavated soil. Iron filings could be applied to the surface of the organically-contaminated soil and mixed into the top layer. The top layer would be excavated and the process continued by application of iron filings to the next and subsequent layers excavated. Each excavated lift could be placed on the previous lift. Once all the contaminated soil has been treated, excavated, and stockpiled, water may need to be applied and the soil pile covered. The soil would need to be sampled and analyzed, or the Technical Assistance Team may be able to recommend an innovative, laborsaving *in situ* analytical technique. Passive treatment could require approximately two to three months.

Scope

Fluor Fernald is requesting expert technical assistance in the search for, evaluation of, and selection of an optimum treatment technology to treat the organically contaminated soil. Additionally, Fluor Fernald is requesting support in the timely deployment of the treatment technology. Fluor Fernald requests expert technical assistance from OST for this initiative involving Technical Assistance followed by deployment. Scope items include:

- Evaluation of potential treatment technologies;
- Applicable expert industry specialists in the treatment of organically-contaminated soil;
- Application of lessons learned from other DOE sites; and
- Support in an expedited deployment of the optimum design and technology to assure timely site closure.

Cost and Benefits

Soil excavation and stockpiling was initiated in October 2001. Treatment must be initiated by October 2002. Fluor Fernald has conducted a limited study of treatment options for the organically contaminated soil. Indications are that a schedule savings could be realized with selection and deployment of an optimum technology. Success of this initiative is intended to enable the contaminated soil to be put to beneficial use as construction material in the Fernald disposal facility, and avoid packaging, shipping and off site disposal of the material at high cost.

Schedule

Initial Excavation/stockpiling	10/01
Initiate treatment	10/02

Summary

Fluor Fernald is requesting expert technical assistance and support from OST in FY02 and FY03 for evaluation, recommendation, development and application of an optimum treatment process for organically contaminated soils.

OHIO TECHNICAL ASSISTANCE REQUEST

Disposition of Unique and Problem Wastes Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. FEMP-02-14

TITLE: DISPOSITION OF ENRICHED URANIUM COMPOUNDS AND RESIDUES

The Fernald Uranium Waste Disposition (UWD) Project has approximately 2387 containers (420 tons) of enriched uranium compounds and residues. These containers, with levels of 1% to 5% U-235 uranium enrichment must be dispositioned to enable the site to close. The most prevalent compounds are magnesium fluoride, uranium oxides, and uranium tetrafluoride. Department of Transportation (DOT) requirements for the shipment of fissile material do not permit the drums to be shipped in their present state. Numerous alternatives have been considered for disposition, but, due to cost or schedule constraints, no adequate solution has been discovered.

The uranium concentration varies from 1% to 88%. The population of drums in the 4% to 5 % range is low. The number of drums of material in the 1% range is very high. Examination of options has been limited. Options include mixing the material with other material such that the composite uranium enrichment does not exceed 1%, or the concentration of U235 in the waste does not exceed 5 grams in any 10 liter volume; or packaging the material in an alternate type of waste container such that it meets DOT shipping requirements. Both alternatives appear to require excessive labor, cost and schedule, and therefore present very high project risk and jeopardize the site closure schedule.

Assistance is required to develop other strategies and options for disposition of this waste. Because of a very aggressive schedule for disposition of this material to allow the area where the material is presently stored to be remediated starting in 2003, the alternatives must be supplied in draft form to Fernald Project within 60 days (by June 2002). A schedule or duration to achieve any alternatives is urgently needed. Fernald will provide a very detailed list of material types, quantities, enrichments, and uranium concentrations, as well as a report detailing the existing evaluations and recommendations.



Closure Site Technology Project

DELINEATION AND REMEDIATION OF UNDERGROUND CONTAMINATES

Project Description

There is an immediate need for Technical Assistance and innovative Technology Deployments at two of the five Ohio Field Office (OH) sites. Determining the extent of contamination around and under buildings followed by the remediation of that contamination is now a closure determining issue at both Ashtabula and Mound. The problem is currently believed to be less critical at Columbus and West Valley, but it could also develop into a critical issue at these sites later. Fernald is believed to have less concern in this project area because of previous and on-going support from the Office of Science and Technology (OST) and because of the availability of on-site burial.

This initial project description contains six requests for deployment of alternative technologies previously identified by the sites. In addition, individual requests for technical assistance in four specific problem areas are included in this initial submission. Work on the requests can begin immediately and can produce meaningful results beginning this year.

It is anticipated the technical assistance will produce subsequent requests for technology deployments from now until Closure in 2006. For this reason, OST is requested to view this project as a continuing Closure Support Project for the duration.

The initial requests for identified Technology Deployments on the following pages are:

- **AEMP 02-02: Pipe Explorer**
Combined with
- **MEMP 02-02: Characterization of Contaminated Piping Inside,
Between and Underneath Buildings**
and
- **CEMP 02-06 Characterization of Contaminated Piping**

- **AEMP 02-05** **Surface Characterization**
- **MEMP 02-08** **Cone Penetrometer Deployment**
- **AEMP 02-04** **GeoProbe Deployment**
- **CEMP 02-01** **Dynamic Flow Test to Support WIDE Deployment**

The initial requests for Technical Assistance on the following pages are:

- **CEMP 02-07** **Surface Characterization for Free Release**
- **AEMP 02-03** **Integrated Subsurface Characterization**
 Combined with
- **MEMP 02-04** **Integrated Subsurface Characterization**
- **CEMP 02-02** **Subsurface Water Management**
- **MEMP 02-03** **Real-Time Pu238 Characterization**

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Delineation and Remediation of Underground Contaminates Project

ASHTABULA ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. AEMP-02-02

TITLE: PIPE EXPLORER

PROBLEM STATEMENT: AEMP plans to spend significant resources to excavate all subsurface piping, sewer lines, drain lines. The Ashtabula Environmental Management Project (AEMP) has approximately 9,000 linear feet of buried piping 2” – 30” diameter at 5’ – 30’ below surface grade (bsg). This estimate is based on preliminary screening surveys of plans and drawings that have been used for the current and on-going AEMP project re-baselining efforts.

Approximately 5,000 linear feet (lf) is below contaminated slabs and must be removed. Some of these are process pipes that are known to be contaminated and not free-releasable even with aggressive decontamination. Others (i.e. storm sewer lines, fire lines, abandoned water lines) may be easy to decontaminate or already clean.

The other 4,000 lf is outside the contaminated footprint and is either known to be clean or may be easier to decontaminate. Any runs of pipe that can be easily decontaminated and verified clean with in-situ survey techniques would be suitable to be abandoned in place and grouted if they can be shown to be free-releasable against site clean-up criteria.

The pipe exploring survey system was deployed at the Columbus Environmental Management Project (CEMP) in 1999. The Pipe ExplorerTM was able to identify contaminated underground pipe drain segments without excavation and save the project nearly \$5 million over baseline estimates.

REQUEST: DOE-OH and AEMP are requesting deployment assistance to provide support funding (and/or Pipe-Explorer rig) to deploy Pipe-Explorer technology at AEMP by 6/1/02.

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Delineation and Remediation of Underground Contaminates Project

MIAMISBURG ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. MEMP-02-02

**TITLE: CHARACTERIZATION OF CONTAMINATED PIPING INSIDE, BETWEEN, AND
UNDERNEATH BUILDINGS**

PROBLEM STATEMENT: The Miamisburg Environmental Management Project (MEMP) has approximately 16,000 lineal feet of sanitary sewer lines and 34,000 lineal feet of storm sewer. MEMP plans to spend significant resources to characterize these lines in order to determine which lines have sufficient levels of contamination to justify removal actions. An accurate method to characterize the contamination levels in-situ could save significant time and avoid unnecessary excavation costs.

REQUEST: DOE-OH and MEMP are requesting technical assistance to evaluate potential in-situ characterization technologies (such as Pipe-Explorer). As an immediate follow on, additional assistance is requested in the full-scale deployment of the selected technologies. The current schedule would require deployment at MEMP by 6/1/02.

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Delineation and Remediation of Underground Contaminates Project

COLUMBUS ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. CEMP-02-01

**TITLE: CHARACTERIZATION OF CONTAMINATED PIPING INSIDE, BETWEEN AND
UNDERNEATH BUILDINGS**

PROBLEM STATEMENT: The Columbus Environmental Management Project (CEMP) has approximately 4,000 lineal feet of sanitary sewer lines and 4,000 lineal feet of storm sewer. CEMP plans to spend significant resources to characterize and stabilize these lines in order to remove these services that contain sufficient levels of contamination in a safe industrial manner with minimum impact. An accurate method to characterize and stabilize the contamination levels in-situ could save significant time and avoid unnecessary excavation costs.

REQUEST: DOE-OH and CEMP are requesting deployment assistance in the in-situ characterization and stabilization phase of this remediation. By isolating the site services and accelerating the remediation services, significant cost savings can be realized. The current schedule would require deployment at CEMP by 10/01/02.

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Delineation and Remediation of Underground Contaminates Project

ASHTABULA ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. AEMP-02-05

TITLE: SURFACE CHARACTERIZATION

PROBLEM STATEMENT: AEMP plans to spend significant resources to excavate all contaminated surface and subsurface soil. The Ashtabula Environmental Management Project (AEMP) has estimated the extent of contaminated soil could range from 10,000 to 70,000 tons. This estimate is based on preliminary screening surveys of plans and drawings that have been used for the current and on-going AEMP project re-baselining efforts.

Preliminary characterization has been completed on most of the site using conventional means of physically sampling from gridded areas. The validation of this initial information is needed in order to more correctly identify the extent of contamination across the site.

REQUEST: DOE-OH and AEMP are requesting deployment assistance to provide the equipment and expertise used at the Fernald site to resolve this same problem. An immediate deployment of this proven technology along with the trained personnel could provide AEMP with better information on which to plan the final closure of the site.

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Delineation and Remediation of Underground Contaminates Project

MIAMISBURG ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. AEMP-02-08

TITLE: CONE PENETROMETER DEPLOYMENT

PROBLEM STATEMENT: MEMP plans to spend significant resources to excavate all contaminated subsurface soil. The Miamisburg Environmental Management Project (MEMP) has estimated the extent of contaminated soil in Potential Release Site (PRS) 66 could range from 30,000 to 70,000 cubic yards. This estimate is based on preliminary screening surveys of plans and drawings that have been used for the current and on-going MEMP project re-baselining efforts.

Preliminary work has been done with the conventional approach of drilling wells to retrieve samples. The results indicating additional sampling on an on-going basis is needed and will be very costly if done by conventional means.

REQUEST: DOE-OH and AEMP are requesting deployment assistance to provide support funding to locate and deploy a Cone Penetrometer Unit at MEMP. Access to the unit will be needed off-and-on for the duration of the cleanup of the numerous PRS's across the site.

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Delineation and Remediation of Underground Contaminates Project

ASHTABULA ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. AEMP-02-04

TITLE: GEOPROBE DEPLOYMENT

PROBLEM STATEMENT: AEMP plans to spend significant resources to excavate all contaminated subsurface soil. The Ashtabula Environmental Management Project (AEMP) has estimated the extent of contaminated soil could range from 10,000 to 70,000 tons. This estimate is based on preliminary screening surveys of plans and drawings that have been used for the current and on-going AEMP project re-baselining efforts.

Preliminary work with a rented GeoProbe has produced positive results indicating additional sampling on an on-going basis is needed and will be very cost effective. In addition to using the unit to perform on-going sampling, it would be used to inject the bio-remediation media underground during the next few years.

REQUEST: DOE-OH and AEMP are requesting deployment assistance to provide support funding to locate and deploy a GeoProbe Unit at AEMP by 6/1/02.

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Delineation and Remediation of Underground Contaminates Project

COLUMBUS ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. CEMP-02-01

TITLE: DYNAMIC FLOW TEST TO SUPPORT WIDE DEPLOYMENT

PROBLEM STATEMENT: The Well Injection Depth Extraction (WIDE) system is a hybrid soil cleaning system that is currently targeted for *in-situ* remediation of a Cesium (Cs)-contaminated filter bed at the CEMP's West Jefferson site. The ITRD program (via EM-50's SubCon program) recently provided technical assistance (\$20K) in the form of bench-scale tests by Dr. Shas Mattigod at PNNL to perform "proof of principle" studies. These tests showed that a lixiviant, made up of water, citric acid, and a proprietary compound (an ammonium citrate dibasic) could effectively separate the Cs from the soil particles during extraction. The pregnant liquor is processed through a Selective Separation Cartridge to remove the now soluble Cesium. The test results were published in a report entitled "Lixiviant Tests to Assess Leachability of Cesium-137 from West Jefferson North Site Soils". This report included a recommendation to perform a set of dynamic flow tests using the developed lixiviant to more accurately predict Cs-137 removal efficiency under field conditions.

REQUEST: DOE-OH and CEMP (BCLDP) are requesting continued technical assistance to complete bench-scale tests with subsequent use of the results to optimize the engineering design for the WIDE system that will be deployed during FY 2002. Soil samples collected from the abandoned filter bed have been prepared and are currently staged for the final testing at PNNL. The cost for this final stage testing is \$50,000. The DOE-OH and CEMP (BCLDP) requests funding for PNNL for optimization testing during 2nd Quarter 2002. The results of these tests will provide valuable information necessary to operate the WIDE system in a more effective and efficient manner.

OHIO TECHNOLOGY DEPLOYMENT REQUEST

Delineation and Remediation of Underground Contaminates Project

COLUMBUS ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. CEMP-02-07

TITLE: SURFACE CHARACTERIZATION FOR FREE RELEASE

PROBLEM STATEMENT: CEMP plans to spend significant resources to free release all surface and subsurface soil on Battelle's 11- acre site. The Columbus Environmental Management Project (CEMP) has performed the subsurface sampling and found the extent of contaminated soil to be relatively small. This estimate is based on preliminary screening surveys of plans and drawings that have been used for the current and on-going CEMP project re-baselining efforts. Preliminary characterization has been completed on most of the site using conventional means of physically sampling from gridded areas. In order to free release the site, this data must be combined with an accurate surface monitoring "walk-over" and be presented, after an Independent Verification Contractor (IVC) review, to the NRC. The use of the Sub-Surface Multi-Spectral Contamination Monitor (SMCM) would greatly accelerate and enhance the free release process. Moreover, by free releasing this area from the project scope, the S&M and monitoring requirements of the project can be reduced.

REQUEST: DOE-OH and CEMP are requesting deployment assistance to provide the equipment and expertise for the SMCM. An immediate deployment of this proven technology along with the trained personnel could provide CEMP with vital information for free release and the closure of the site. The DOE-OH and CEMP is requesting funding during the 4th Quarter 2002.

OHIO TECHNICAL ASSISTANCE REQUEST

Delineation and Remediation of Underground Contaminates Project

ASHTABULA ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. AEMP-02-03

TITLE: INTEGRATED SUBSURFACE CHARACTERIZATION

PROBLEM STATEMENT: The AEMP closure site is currently conducting D&D activities before transitioning the site back to the owner. There are several different areas being investigated to determine the extent of possible or known contamination in the soil and under the buildings.

An example is the Hi-Bay Building that was used for extrusion of uranium into various shapes. This building is slated for demolition and disposal. The AEMP base-line plan considers the top two feet of soil immediately beneath and 15 feet beyond building footprints as potentially contaminated. There is evidence, however, to suggest that subsurface contamination may be less extensive for the site. The primary goal of additional characterization work is to better define the nature and extent of radionuclide contamination beyond arbitrary boundaries in support of base-line cost and schedule revisions. In addition, the potential contaminants present small risk to workers and may require less stringent worker protection efforts. Better characterization information would allow efficient tailoring of the protection activities to the various demolition activities on an as needed basis and thus save costs while still being protective. Additional characterization work for the building will be conducted in conjunction with similar work at Mound.

In addition to this specific example, there are other areas on the site where improved technical planning will allow the project to better reduce uncertainties and increase the confidence level in closing the site by 2006.

REQUEST: DOE-OH and AEMP are requesting both technical assistance and deployment assistance to provide for integrated subsurface characterization for many of its projects including the Hi-Bay Building. This request is for assistance in identifying the best available technologies for subsurface access and characterization of radioactive and hazardous contaminants so that these technologies can be designed into an integrated suite of technologies. These technologies can then be applied initially to Mound or Ashtabula and subsequently to other OH sites as needed during closure activities. The technical experts would be needed in the near future and would be expected to remain available to the site as needed for specific requests for assistance.

OHIO TECHNICAL ASSISTANCE REQUEST

Delineation and Remediation of Underground Contaminates Project

MIAMISBURG ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. MEMP-02-04

TITLE: INTEGRATED SUBSURFACE CHARACTERIZATION

PROBLEM STATEMENT: The MEMP closure site is currently conducting D&D activities before transitioning the site to the City of Miamisburg for re-industrialization. There are several different Potential Release Sites (PRS's) being investigated to determine the extent of possible or known contamination in the soil and under the buildings.

An example is the Semi-Works (SW) and the Research (R) Building which were used for research activities in the past. These buildings are slated for demolition and disposal. The MEMP base-line plan considers the top two feet of soil immediately beneath and 15 feet beyond building footprints as potentially contaminated. There is evidence, however, to suggest that subsurface contamination may be more extensive for the SW and R building complex. The primary goal of additional characterization work is to better define the nature and extent of radionuclide contamination beyond arbitrary boundaries in support of base-line cost and schedule revisions. In addition, a few of the potential contaminants present a significant risk to workers and would require more stringent worker protection efforts. Better characterization information would allow efficient tailoring of the protection activities to the various demolition activities on an as needed basis and thus save costs while still being protective. Additional characterization work for the SW/R buildings will be conducted in two phases. Phase I will focus primarily on soils outside the SW and R buildings. Phase II will be a more in-depth characterization effort, building off the results from the Phase I effort.

In addition to this specific example, there are other areas on the site where improved technical planning will allow the project to better reduce uncertainties and increase the confidence level in closing the site by 2006.

REQUEST: DOE-OH and MEMP are requesting both technical assistance and deployment assistance to provide support funding for integrated subsurface characterization for many of its projects including SW-R Buildings. This request is for assistance in identifying the best available technologies for subsurface access and characterization of radioactive and hazardous contaminants so that these technologies can be designed into an integrated suite of technologies. These technologies can then be applied initially to Mound and subsequently to other OH sites as needed during closure activities. The technical experts would be needed in the near future and would be expected to remain available to the site as needed for specific requests for assistance.

OHIO TECHNICAL ASSISTANCE REQUEST

Delineation and Remediation of Underground Contaminates Project

COLUMBUS ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. CEMP-02-02

TITLE: SUBSURFACE WATER MANAGEMENT

PROBLEM STATEMENT: The BCLDP has identified subsurface water problems that will adversely affect soil excavation and subsurface D&D and subsequently hinder cleanup activities at the West Jefferson North site. Subsurface water is leaking into the basements of JN-3 and JN-1 (Jefferson North – JN) buildings at the West Jefferson North site and underground water has also been observed to be leaking into a sewer line that goes to the north filter bed on the same site. This unresolved condition has already affected the removal of contaminated pipelines in the basement area of JN-3. With the extremely low hydro-conductivity of the area's soils, it will continue to hamper D&D efforts until an effective resolution can be established. Various opinions have been expressed regarding the source(s) of the water and how to manage the water during subsurface D&D of the facilities and utilities. The site has already begun an effort to define the problem and ultimately identify a solution by initiating a study to measure subsurface water levels.

REQUEST: DOE-OH and CEMP (BCLDP) are requesting technical assistance to evaluate and define the underground water problem and to identify the most effective means to manage this subsurface water in the area during excavations. We are requesting that experts from the National Laboratories and industry be tasked to support us in defining the nature and extent of the subsurface water problem and identify a solution to managing this subsurface water in order that cleanup activities can proceed at the site.

OHIO TECHNICAL ASSISTANCE REQUEST

Delineation and Remediation of Underground Contaminates Project

MIAMISBURG ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. MEMP-02-03

TITLE: REAL-TIME PU-238 CHARACTERIZATION

PROBLEM STATEMENT: The Mound site has a number of areas where soils are contaminated with Pu-238. As an example, Potential Release Site 66 (PRS-66), contaminated with Th-232 and Pu-238. PRS 66, is an approximately 96,250 square foot historical disposal site located under the parking lot southeast of Buildings 29 and 98 and south of Building 51. Currently, most of the area is an asphalt parking lot constructed in 1984. PRS 66 was once a steep ravine, used for the disposal of construction soils and debris, including 10,000 to 15,000 empty drums that once contained thorium-232 (^{232}Th), plutonium-238 (^{238}Pu), a polonium-210 (^{210}Po) contaminated washing machine, and a thorium-232 (^{232}Th) contaminated flat bed truck.

In the case of PRS 66, the activity standards for ^{238}Pu and ^{232}Th , the isotopes of concern, have been established at 55 and 3 pCi/g, respectively. The estimated volume of the proposed remedial action excavation as reported in the PRS 66 Engineering Evaluation / Cost Analysis (EE/CA) document is 43,000 y³. The purpose of the excavation activities at PRS 66 is to bring the site to closure by establishing compliance with established cleanup standards. For most of the common radioactive contaminants at Mound, cleanup verification can be conducted in an efficient manner by using field instruments as a tentative indication that cleanup is complete followed by soil samples being sent to an offsite lab for final verification. However, for Pu-238 field detectors are not sensitive enough to “see” levels near the cleanup goal of 55 pCi/g. In this case work is stopped and time consuming lab analysis is conducted onsite. When the onsite analyses indicate potential compliance with the cleanup goal samples are then taken for offsite confirmation. A field detector with sufficient sensitivity for PU-238 could enable Mound to avoid the work stoppage and the onsite lab costs.

REQUEST: DOE-OH and the MEMP are requesting technical assistance to support the investigation of field characterization technologies that can field detect Pu-238 at less than 55 pCi/g level in soils.



Closure Site Technology Project

FERNALD SILOS

Project Description

This document outlines the Ohio Field Office (OH) request for OST support of technical projects pertaining to the Fernald Silos. Concise descriptions of the following technical support projects are enclosed:

- **FEMP 02-03 Key Components for Disposition of Fernald Silo Wastes**
- **FEMP 02-04 Expedited Disposition of Silo Waste by Shielded Railcar**
- **FEMP 02-05 Risk Reduction and Schedule Acceleration for Fernald Silos 1 and 2 Waste Treatment Container Transfer Cars, Fill Station, and Lid Closure Systems**
- **FEMP 02-06 Fernald Silos Complex Decontamination and Demolition Project**

Each of the technical support project initiatives is intended to start with a Technical Assistance effort to identify the optimum new technology or approach, and then transition into support for deployment of the approach.

OHIO TECHNICAL ASSISTANCE REQUEST

Fernald Silos Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. FEMP-02-03

TITLE: KEY COMPONENTS FOR DISPOSITION OF FERNALD SILOS WASTE

Introduction

Remediation of the Fernald Silos requires several distinct but coordinated sub projects, including excavation of wastes from the Silos; treatment to stabilize the wastes; materials handling, packaging and transportation of the wastes for disposition; followed by demolition and disposition of the Silo structures. This document addresses the need for a step improvement in process efficiency by improved technology for treatment stabilization of the Silos waste stream.

After the waste is removed from the silos using hydraulic excavation, it must be treated to stabilize it prior to shipment for off site disposition. The cost of the stabilization, packaging, transportation and disposal depend strongly on the water content of the waste and the efficiency of the processing operations. Fluor Fernald requires expert technical assistance to complete the treatability studies, technology evaluation and process selection, system design, and technology deployment to improve and optimize the waste loading of treated Silos 1 and 2 (K-65) materials. Slurry density, or waste loading in the stabilized waste form has profound influence on the project risk, worker radiation exposure and total cost of the remediation. Therefore, process optimization and efficiency is paramount. Fluor Fernald will explore increasing the waste loading by including a slurry thickener and mixer in the process line of the Silos 1 and 2 Treatment Facility. Fernald is requesting expert technical assistance to evaluate potential technologies, recommend and help select the optimum technologies and implementation approach that will assure timely closure of the Fernald site. Additionally, Fernald is requesting EM-50 support in real time deployment of the recommended optimum technologies to address related or integrated site needs and support site closure by 2006.

Need

A primary concern in the successful treatment of the Silos 1 and 2 material is the removal of excess water. The water will be generated from the hydraulic sluicing and slurry transfer of material from the silos to the Transfer Tank Area (TTA) and from the TTA to the treatment facility. Excess water increases costs for labor and materials, extends schedule, and increases transportation and disposal costs. Slurry optimization is the essence of efficiency, although radiation dose rate from the stabilized waste form must be considered in overall optimization. A slurry thickener is incorporated into the design of the treatment facility to remove excess water and to thicken the solids content to the

proposed waste loading of 17% by weight. Downstream of the slurry thickener a mixer will be included in the treatment facility design to effectively and thoroughly blend additives into the slurry. Currently, key dewatering and settling information necessary for a successful design of the thickener is being generated through treatability studies. Furthermore, the physical and chemical data generated during the treatability studies will be utilized in the design of the mixer.

Scope

As stated above, the proposed waste loading for Silos 1 and 2 material is 17% by weight. However, the Silos 1 and 2 Project is anticipating that a waste loading of 25% by weight can be achieved for those portions of Silos 1 and 2 material with low radium-226 concentrations, and therefore, low dose levels. Being able to achieve a 25% by weight waste loading for a portion of the Silos 1 and 2 material will result in a lower volume of treated waste. This would reduce the number of packages of waste, the number of shipments of wastes to the disposal facility, and the disposal volume. This, in turn, will result in potential cost savings for the project.

A coordinated effort is required to effectively apply the lessons learned from treatability testing to design of the optimum thickener to allow for a potential waste loading of 25% by weight and optimum design of a mixer that will consistently produce a homogeneous treated waste. Fluor Fernald requests expert technical assistance from Office of Science and Technology (OST) for this technology research and application development. Items proposed for investigation and coordination include:

- Evaluation of treatability test information and results;
- Applicable expert industry specialists in slurry thickener application and design;
- Applicable expert industry specialists in slurry mixer application and design;
- Sensitivity analysis for variations in slurry supply density;
- Application of lessons learned from other Department of Energy (DOE) sites; and
- Support in an expedited deployment of the optimum design and technology to assure timely site closure.

Cost and Benefits

Potential savings can be realized in packaging, transportation, and disposal costs if a portion of the Silos 1 and 2 material can be treated at a waste loading of 25% by weight. The total cost savings of an estimated \$3M will be dependent on the amount of Silos 1 and 2 material with a low enough concentration of Radium-226 that is amenable to a waste loading of 25% by weight. Multi-discipline, expert technical assistance is required from EM-50 in this matter.

Schedule

Unit specification and procurement	TBD
Mobilization and SSR	TBD

Summary

Fluor Fernald is requesting expert technical assistance and support from OST in FY02 and FY03 for evaluation, recommendation, development and application of an optimum slurry thickener/mixer system to assure a 2006 site closure.

OHIO TECHNICAL ASSISTANCE REQUEST

Fernald Silos Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. FEMP-02-04

TITLE: EXPEDITED DISPOSITION OF SILOS WASTE BY SHIELDED RAILCAR

Introduction

Remediation of the Fernald Silos requires several distinct but coordinated sub projects, including excavation of wastes from the Silos; treatment to stabilize the wastes; materials handling, packaging and transportation of the wastes for disposition; followed by demolition and disposition of the Silo structures. This document addresses the need for a step improvement in the technical approach for packaging and shipment of the stabilized Silos waste form.

Fluor Fernald requests expert, multi-discipline technical assistance for the design, testing and demonstration, and initial deployment of a new, technically advanced railcar shielding system to support the timely disposition of Fernald Silos treated wastes and support the timely closure of the site. Neither industry nor DOE have such capability presently. The Fernald site presently uses a system of large gondola railcars to dispose of pit wastes. Limited studies by the Silos Project have indicated that capitalizing on the features of the existing rail system and using an option of railcar liners can significantly expedite and reduce costs for the disposition of Silos wastes. Immediate development and deployment of packaging to contain radon and attenuate direct gamma radiation during handling, loading, transportation, and disposition of treated high radium content radioactive waste is necessary to support Fernald's accelerated schedule to close by FY06. The railcar liner designed under this initiative will be reusable and can be deployed by other DOE sites.

Need

Fluor Fernald has two earthen-bermed, concrete silos (Silos 1 and 2) containing a total of 8,012 yd³ of 11(e)(2) by-product material and 878 yd³ of a protective BentoGrout™ clay. The 11(e)(2) by-product material and BentoGrout™ clay will be cement stabilized and transported to Envirocare of Utah for disposal in gondola railcars.

Silos 1 and 2 material carries hazards from both radon gas emanation and from direct gamma radiation exposure. Packaging to contain the radon and attenuate the direct radiation during handling, loading, transportation, and disposition must be developed. This packaging must meet Department of Transportation (DOT) and physical handling requirements. The design must also account for ease of package closure, and handling using remote means. Expert technical assistance is needed to thoroughly consider all

requirements by regulators, stakeholders, waste acceptance criteria, labor costs, constructability and operability, ALARA exposure minimization. The technical assistance and closure project support will enable Silos Project Management to select, procure and deploy an optimized shielding/transport/disposition system for expedited, safe and efficient disposition of Silos waste.

Benefits

This initiative will benefit Fernald as well as other DOE sites by the development and deployment of a technically superior, proven system for railcar shielding, transport and disposition. Direct benefits are expected immediately at Fernald from reduced occupational exposure and from reduced operator turnover (extra labor costs) that would otherwise be expected at a DOE site for this type of project. Technical assistance to maximize the waste “payload” within gondola railcar dimensions and operating system will reduce transportation costs. A gondola railcar incorporating a removable/flexible shielding system would be expected to reduce transportation costs. Expert technical assistance from EM-50 will be used to explore optimized approaches including incorporating a reusable liner in the railcar instead of using individual containers, use of an adjustable system or liner in order to fit multiple types/sizes of industrial railcars, and a system capable of shielding against a range of radiation levels. The information developed from the expert technical assistance and closure project support will enable Fernald Silos Project management to expedite decision making, procurement, deployment of the advanced system and to achieve reduced schedule risk for waste disposition and closure of the site. The optimum system will be used and reused at Fernald until site closure is completed, and other DOE sites are expected to be able to directly deploy the system for use in disposition of a wide range of wastes.

Scope

Fluor Fernald proposes that EM-50 provide expert technical assistance and closure support to perform the following scope of work:

- Develop a technically superior (reusable liner) flexible shielded transport system for gondola railcars of variable sizes.
- Design the system such that shielding can be modified to meet other radiological shielding requirements. (i.e., allow both Fernald and other users to cost effectively shield waste that is more or less radioactive)
- Model the shielding requirements and the characteristics of the waste, as well as the operation, and determine the most cost effective approach to shield the chemically stabilized waste for shipment from Silos 1 & 2
- Meet the existing container size requirements
- Support the Fluor Fernald project team developing container design, Silos 1 & 2 treatment facility design and rail transportation.
- Support the procurement, fabrication, verification and deployment of the first-of-a-kind shielding system for deployment in one 60-railcar unit train.
- Demonstrate the shielding/transport system capability by supporting the first unit train shipment of Silos 1 & 2 waste material to the disposal site at Clive, Utah.

- Procure, fabricate, and deliver, a prototype linear for testing the capability and operability with containers.
- Develop the design and support prototype linear testing.

Fluor Fernald will provide all required site project personnel for interface for the expert technical assistance team provided by EM-50.

Deliverables

The deliverables for this initiative will include:

- A detailed project schedule
- Radiation modeling results and modeling report
- Design of the optimum shielding/transport system
- A prototype shielding system or unit
- The test plan for testing the system
- Performance of testing and demonstration of the system
- The test report on the prototype system with design change recommendations
- Installation, usage, and removal instructions
- A maintenance and decontamination manual
- An initiative and closeout report
- All assistance and support required for procurement, commissioning and deployment of the deployment of the system for one unit train for waste disposition

Schedule and Milestones

While the initiative team will develop a final schedule for this project, the following milestone dates are tentatively projected:

- Prototype manufactured within two months after confirmation of EM-50 support
- Prototype tested by three months following support confirmation
- Prototype test report to be completed by two weeks after conclusion of prototype testing.
- Award of contract for manufacturing of shielding/transport system for 60 railcar unit train by 6 months
- Installation, usage, and removal manual by 9 months
- Maintenance and decontamination manual by 10 months after receipt of funding

Cost

The estimated cost of the joint initiative with EM-50 for deploying the first-of-a-kind shielding/transport advanced rail disposition system for the Silos treated waste is \$13 million dollars, including Fluor Fernald contributions. Upon successful completion of this joint initiative for first-of-a-kind deployment with EM-50, Fluor Fernald intends to procure additional shielding/transport and disposition systems to equip 129 railcars.

Summary

Fluor Fernald requests \$13 Million in the second quarter of FY02 to support the Railcar Shielding Initiative. Fluor Fernald expects to complete the scope of this initiative in the first quarter of FY03.

OHIO TECHNICAL ASSISTANCE REQUEST

Fernald Silos Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REQUEST NO. FEMP-02-05

TITLE: RISK REDUCTION AND SCHEDULE ACCELERATION FOR FERNALD SILOS 1 AND 2 WASTE TREATMENT CONTAINER TRANSFER CARS, FILL STATION, AND LID CLOSURE SYSTEMS

Introduction

Remediation of the Fernald Silos requires several distinct but coordinated sub projects, including excavation of wastes from the Silos; treatment to stabilize the wastes; materials handling, packaging and transportation of the wastes for disposition; followed by demolition and disposition of the Silo structures. This document addresses the need for a step improvement in safety and efficiency by improved technology for materials handling.

The silos waste treatment process will deliver the stabilized waste form into containers that must be sealed and transferred out of the process area. The container transfer cart, fill station, and lid closure systems are critical path, high priority systems for finalizing design and optimizing operation of the Fernald Silos 1 and 2 Treatment Facility. The operations, efficiency and safety of the systems are expected to benefit substantially from remote operation of mechanical or enabling robotic components due to the nature of the radioactive waste. A critical operational enhancement is expected to be a remotely operated lid closure and sealing system for transfer cars planned for moving the treated silo wastes out of the process area. The system components and the operations must be fully integrated and optimized to ensure the overall treatment operation is both safe and efficient. These systems are critical to the Fernald Closure schedule. Because of the highly technical content and critical nature of the waste container and transfer systems, Fernald seeks the engagement of EM-50 to apply expert technical assistance for design, integration, and optimization of the system components and operation, followed by demonstration and accelerated, first-of-a-kind deployment of a major treated materials handling system for the disposition of the Fernald Silos 1 and 2 waste.

Need

Fernald has insufficient skills and resources to conduct and support the technical requirements for timely deployment of a technically advanced and efficient integrated Silos waste treatment, transfer and materials handling systems. Manual operations pose substantial project risk, are inefficient and risk high worker exposure from the contaminated waste form. Technical assistance and fully integrated project engagement and accelerating funding from EM-50 is needed to achieve acceleration of the

optimization, design and the procurement of the Silos 1 and 2 container transfer cart, fill station, and lid closure systems.

Three technically improved system (procurement) packages could be initiated for this part of the Silos remediation effort. The first package is expected to comprise a robotic or remotely operated XYZ translator and associated tools for lifting the product container lid, to allow for filling the container with treated product and applying sealant and installing the lid on a filled container. Included in the package will be arrangement drawings for the product container fill room, container dimensions and lid arrangement. The package would also include specifications for performance.

A second package is expected to comprise an optimized fill system or funnel device that interfaces the container with the mixer discharge chute. This package must include fabrication drawings and specifications for the cart system, details on the product mixer, the container drawings, and the product container fill room arrangement, and performance requirements.

The third package is expected to address the design, optimization and procurement of the container transfer cart. This package would include steps necessary to integrate with other system components, fabrication drawings and specifications for the cart and its control system interface with other systems.

Prototype testing and demonstration of proper operation of the individual systems will be necessary, as well as demonstration of efficient integration of systems. The integrated testing will have to demonstrate the ability to position a container, remove the container lid, link the funnel with the container, unlink the funnel, apply sealant to the container opening, place the container lid and mechanically fasten the lid to the container and remove the container. Upon acceptable completion of the integrated testing, the final designs for each package will provide the information necessary for the Fernald Silos Project to approve systems for fabrication and installation.

EM-50 support will be applied to accelerate design, optimization, and development of appropriate procurement packages for equipment, instrumentation and services of commercial suppliers, as well as for appropriate testing and demonstration.

Benefits

The container transfer cart, fill station, and lid closure systems are critical systems for finalizing design of the Silos 1 and 2 Treatment Facility. Finalizing design of these systems and confirming proper operation and integration of the systems must be completed prior to finalizing design of the Silos 1 and 2 Treatment Facility. The application of EM-50 support in FY-02 for the accelerated procurement of these systems will minimize schedule impacts for final closure of the FEMP site.

Cost

Fluor Fernald proposes that EM-50 support this initiative to reduce Fernald site wide schedule risk. The container transfer cart, fill station, and lid closure systems tasks estimates include:

Design	\$ 275,000
Container Transfer Carts	\$ 125,821
Fill Station	\$ 243,839
Lid Closure System	<u>\$ 514,771</u>
	\$1,159,431

The systems packages can be accelerated into FY-02, and the prototype testing of the individual systems and integrated system conducted in FY-03.

Schedule

The scheduled completion dates for the following activities will expedite the current baseline.

Establish EM-50 support	04/01/02
Issue RFP - Lid Closure	05/13/02
Issue RFP - Fill Station	05/13/02
Issue RFP - Cart System	05/13/02
Award Contracts	07/01/02
Review System Submittal	08/08/02
Procure Material	09/30/02
Fabricate Systems	09/30/02
<i>Test Individual Systems</i>	
<i>10/10/02</i>	
Integrated Systems Test	12/26/02
Finalize Systems Design	01/13/03

Summary

Fluor Fernald requests EM-50 support and acceleration funding of \$1.2 M for the design, optimization, procurement, integration and prototype testing, including integrated testing of the container transfer cart, fill station, and remote-operated lid closure systems for treated Fernald Silos 1 and 2 wastes. The commitment of EM-50 support in FY-02 for the accelerated deployment of these systems will minimize project risk and will minimize adverse schedule impacts for final closure of the FEMP site.

OHIO TECHNICAL ASSISTANCE REQUEST

Fernald Silos Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. FEMP-02-06

TITLE: FERNALD SILOS COMPLEX DECONTAMINATION AND DEMOLITION PROJECT

Introduction

Remediation of the Fernald Silos requires several distinct but coordinated sub projects, including excavation of wastes from the Silos; treatment to stabilize the wastes; materials handling, packaging and transportation of the wastes for disposition; followed by demolition and disposition of the Silo structures. This document addresses the need for enabling technology or an entirely new technical approach to achieve improved demolition and disposition of the Fernald Silo structures.

The Need

In the baseline plan, the Fernald Silo structures require excavation of the waste material; demolition of the structures; followed by packaging, transportation and disposition of the contaminated material. To assure the most efficient, safest and most timely closure of the site, the hand-over condition from one stage of the overall process to the next stage must be carefully designed and optimized, with full consideration of down-stream effects of the technical conditions of the material at each stage. Silos Project support and treatment facilities comprising the Fernald Silos Complex also require D&D and disposition. The primary concern in the successful and economical decontamination and demolition (D&D) of the Fernald Silos Complex is prevention of the release of radiological airborne emissions during demolition activities. Application of an encapsulation material to the contaminated surfaces in the Complex is an option to maintain airborne emissions generated during demolition activities within regulatory requirements. Expert technical assistance is required to determine the options available and the optimum technical approach to maintain closure schedule and minimize risk for D&D of the Fernald Silos Complex

Scope

The scope of the Silos Complex D&D Project consists of the complete removal and disposition of the following structures and facilities:

- ❑ Structure 34A – Silo # 4
- ❑ Structure 34B – Silo # 3
- ❑ Structure 35A – Silo # 2
- ❑ Structure 35B – Silo # 1
- ❑ Decant Sump Tank System

- ❑ Structure 94A – Vitrification Pilot Plant
- ❑ Structure 94B – All future facilities to be constructed to support the Silos Project, including support systems for which EM-50 technical assistance has been requested
- ❑ Miscellaneous support facilities and infrastructure

The technology applied and the operations must minimize the potential for the release of radioactive and hazardous airborne emissions during demolition activities. Fluor Fernald requests assistance from the DOE Office of Science and Technology (OST) for the selection and deployment of the optimum technology and approach for D&D of the Fernald Silos Complex.

Cost and Benefits

The Fernald Silos Project has conducted a limited study of the options for D&D of the Silos Complex. Indications from the work are that savings can be realized during the D&D of the Silos Complex if contaminated surfaces can be successfully encapsulated instead of constructing a new enclosure around the structures to prevent release of contaminants. The estimated total cost savings from avoiding a new enclosure is approximately \$4M.

Schedule

Technical Assistance can begin in FY02, FY03, or FY04

The schedule for the Silos Complex D&D is as follows:

- | | |
|---|------|
| ❑ Structure 34A – Silo # 4 | FY06 |
| ❑ Structure 34B – Silo # 3 | FY06 |
| ❑ Structure 35A – Silo # 2 | FY06 |
| ❑ Structure 35B – Silo # 1 | FY06 |
| ❑ Decant Sump Tank System | FY06 |
| ❑ Structure 94A – Vitrification Pilot Plant | FY07 |
| ❑ Structure 94B – All future facilities | FY07 |

Summary

Fernald requests multi-disciplinary, expert technical assistance and project support from the DOE Office of Science and Technology to determine and deploy a substantially improved, optimum technical approach to successfully and economically minimize risk of radiological airborne emissions and to minimize closure schedule delays and minimize project cost for the decontamination and demolition of the Fernald Silos Complex.



Closure Site Technology Project

CLOSURE ENABLEMENT

Project Description:

This document outlines the Ohio Field Office (OH) request for support of technical projects required by Ohio sites to enable assured closure performance and schedule, and to optimize the balance between closure and post-closure requirements. Both Fernald and Mound have need of technologies that are in place before the sites can be turned over for final disposition into Long Term Stewardship. Both of the sites have been made aware of this requirement by their stakeholders and regulators. Ashtabula and Columbus have no needs in this area since both sites will be returned to their owners. The West Valley requirements in this project area have not yet been defined.

At this time the primary need is for Technical Assistance continuation at Fernald and Mound. Concise descriptions of the technical support initiatives at Fernald and Mound are described in the attached:

- **FEMP 02-01 Initiative on Post Closure Stewardship Technology**
- **MEMP 02-07 Post Closure Stewardship Monitoring Technologies**

The OH advance work in preparation for closure and future needs will benefit other DOE sites that have yet to recognize issues that they will face in the approach to closure.

OHIO TECHNICAL ASSISTANCE REQUEST

Closure Enablement Project

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT REQUEST No. FEMP-02-01

TITLE: INITIATIVE ON POST CLOSURE STEWARDSHIP TECHNOLOGY

What the Project Needs

The Fluor Fernald contract requires preparation for implementing all aspects of Long Term Stewardship. DOE-FEMP and the DOE Office of Science and Technology (OST) have charged Fluor Fernald Inc. to conduct a project to examine Post Closure Stewardship technology for monitoring and remedy maintenance. Fluor Fernald has begun the Fernald Post Closure Stewardship Project, which is expected to provide first-generation technology to monitor Cell 1 of the On Site Disposal Facility. The site needs additional and advanced monitoring and processes to assure reliable, comprehensive Long Term Stewardship.

Deployment, Implementation

The project first investigated technology to measure physical changes and differential settling in the On Site Disposal Facility (OSDF). Currently, instrumentation is being demonstrated in OSDF Cell #1. The work did not start in time to allow placement of instruments in the body of the cell, or in the leachate collection system. As improvements to the monitoring techniques evolve they will be demonstrated and deployed in subsequent cells.

In FY02 the project will address additional LTS technology needs: passive treatment of leachate; real-time monitoring technology for low concentrations of uranium in water (monitoring OSDF leachate, as well as aquifer restoration and cleanup operations); real-time technology for the measurement/detection of the volume of leachate; real time, automated meteorological monitoring; and the development of a system integrating all of the outputs of the technologies/sensors that sends/stores the information in real-time as a major enhancement.

Schedule

OSDF monitoring first- and advanced-generation deployments FY01- FY06.
Integrated measurements system development and installation FY02- FY06
Demonstration of passive leachate treatment FY02-FY04
Real-time measurements of leachate FY02-FY05

Conceptual Cost Benefits

The cost avoided would be \$20M from avoiding a failure, or even a potential failure, in only one cell of the Fernald OSDF. Monitoring costs are of the order of \$1M/year. The Fernald Post-Closure Technology Project is providing leadership for assuring advanced science and technology utilization for Stewardship for the benefit of all of DOE.

OHIO TECHNICAL ASSISTANCE REQUEST

Closure Enablement Project

MIAMISBURG ENVIRONMENTAL MANAGEMENT PROJECT REQUEST NO. MEMP-02-07

TITLE: POST-CLOSURE STEWARDSHIP MONITORING TECHNOLOGIES

PROBLEM STATEMENT: The Miamisburg Environmental Management Project (MEMP) is in the process of completing site-wide environmental remediation under the auspices of the Comprehensive Environmental Response, Compensation & Liability Act (CERCLA). Consistent with the terms of a January 1998 contract between the DOE-MEMP and the Miamisburg Mound Community Improvement Corporation (i.e., the DOE-designated Community Reuse Organization), upon completing the CERCLA process for discrete parcels of land, the DOE-MEMP transfers title of that property to the MMCIC. Thus far, the DOE-MEMP has transferred three land parcels to the MMCIC. Each parcel has a Record of Decision (ROD), where the Remedy is Institutional Controls in the form of Deed Restrictions. These Deed Restrictions prohibit movement of soil offsite, prohibit the use of groundwater, and limit land use to Industrial Use. There will be additional RODs, as subsequent land parcels complete the CERCLA process; these RODs will contain the same three Deed Restrictions. The ROD for the final land parcel will also include “site-wide” issues, such as post-closure monitoring of groundwater. The DOE-MEMP has an immediate need to identify and deploy potential technologies that will bolster the regulators’ and stakeholders’ confidence in the selected Remedy prior to actual site closure. This will facilitate DOE’s negotiation of the final ROD, without jeopardizing progress against the Critical Path. Data gathered during these initial deployments will allow DOE-MEMP to design a post-closure monitoring program for the entire site that incorporates only those technologies that meet DOE’s criteria for cost-effective and efficient post-closure stewardship. For example, a technology is needed to detect the movement of soil offsite. Ideally, this technology could be operated from a remote location and could provide real-time data to the land steward so that immediate corrective action could be taken; this technology must also be economical to install and maintain. Technologies are also needed to detect the installation of groundwater wells, and to detect changes in land use. Additional technology needs may be identified as the CERCLA cleanup progresses (e.g., technologies for post-closure groundwater monitoring).

REQUEST: DOE-OH and MEMP are requesting technical assistance, in the form of both discrete funds for a Technology Application Project and access to Technical Assistance (i.e., personnel already under contract through other EM-50 funded projects, or at DOE national laboratories and selected universities), to evaluate a variety of technologies that have the potential to meet DOE’s post-closure monitoring needs. DOE-MEMP seeks this funding to investigate applications for current technologies, and not for the development of new technologies. The EM-50 D&D Focus Area (DDFA) is currently funding the

“Long Term Stewardship Initiative” Project at MEMP. In FY02, DDFA provided \$1M in funding for this project; approximately one half of this amount is held in Management Reserve by DOE Headquarters. MEMP plans to deploy at least one technology before the end of FY02, and every year thereafter through FY06. However, MEMP’s plans for deployment are dependent upon EM-50’s ability to provide continued funding for this project, in the amount of at least \$1M/year for FY’s 03-06, as originally planned in Technical Task Plan # OH-21-DD-31. If this funding is not made available to DOE-MEMP, the site may be forced to defer this important issue to a later time. Such deferral would be of grave concern to the regulators and the local community. It is critical to apply resources now to conduct this technology investigation and deployment effort, so that the final ROD can be negotiated with the regulators without impacting the MEMP Closure schedule completion date of 12/31/06. Even though the environmental remediation work may be done, the MEMP Closure Project is not truly “complete” until the final ROD is approved. A post-closure monitoring program is the final piece of any “closure” project.